

1. Induction of Dominant Phenotype by Radiation.

This investigation was designed to study the effect of irradiation upon anthocyanin formation in the aleurone of a stock recessive for one of the factors whose dominant allele is ordinarily necessary for anthocyanin production. The recessive a_1 allele was chosen for study. For the first series, $a_1a_1A_2A_2CCRRPrprdt$ plants were grown in pails in a non-irradiation area and selfed or sibbed. At twenty-four or forty-eight hours after pollination, the plants were placed at various distances from a 145 curie CO^{60} γ source, and remained there until maturity (42-49 days). The ears were harvested and the kernels classified. A similar series was grown in a non-irradiation area and selfed or sibbed for controls. At a dose of 390 r/day of γ -irradiation approximately twenty-six percent of the endosperms show a mottled anthocyanin aleurone, at lower doses the percent of anthocyanin aleurones is correspondingly less. The majority of the mottled aleurones are pink, however an occasional aleurone will be purple or a mixture of pink and purple. The mottled areas are irregular in shape and vary in size. This phenotype appears to be similar to that previously described by Sager (Maize Genetics Cooperation News Letter 1948), Brawn (Maize Genetics Cooperation News Letter 1949), McClintock (unpublished) and others as "flush". In no instance did the mottled anthocyanin pattern appear definitely to be the dotted phenotype as first described by Rhoades, although it may be somewhat similar to the dotted phenotype recently described for an a_1 allele by Nuffer (Maize Genetics Cooperation News Letter 1950).

A majority of the endosperms showing the mottled anthocyanin pigmentation appear to be associated with an undetermined germless condition (i.e. embryos fail to develop). This is also true for those carried thru the next generation. There are some kernels showing the "flush" endosperm in which the embryo appears normal.

Another class of kernels was found in which the aleurones were a mottled brown. These are also heritable and occurred chiefly at the higher doses. For the second series, mature pollen from $a_1a_1A_2A_2CCRRPrprdt$ plants was given 2000 r of X-ray and used to pollinate sister plants. Approximately two percent of the resulting aleurones were of the "flush" type.

In the controls one "flush" aleurone occurred in a total of 4905 kernels examined.

Further studies are in progress in an attempt to determine the nature and inheritance of this "flush" condition.

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